

Appl. No. : 10/781,574
Filed : February 17, 2004

REMARKS

Claims 1-17 are pending in the present application and stand rejected on a variety of grounds. The Examiner objected to Claim 1 finding that "ALD" should be written out as "atomic layer deposition" the first time it is used in the claims. Claim 1 has been amended to address this objection. Claim 14 has also been amended to indicate that the head-gap fill layer is deposited by atomic layer deposition. In addition, the Examiner asked that the first paragraph of the application be updated to reflect the current status of the parent application. The priority information has been updated accordingly. No new matter is added by either of these amendments.

Examiner's Comments

The Examiner found that the term "barrier layer" in Claims 7 and 8 simply refers to a layer formed of a nonmagnetic material and that for the purposes of evaluating the prior art, any nonmagnetic layer would be considered a "barrier layer." Applicants respectfully submit the term barrier layer is a term of art and that the skilled artisan would understand that not all materials would make suitable barrier layers.

Claims Rejections Under 35 U.S.C. § 102

Claims 1 and 5-7 were rejected under 35 U.S.C. § 102(b) as being anticipated by Albert (U.S. Patent No. 4,219,853). Similarly, Claims 1, 2, 5-7 and 11 were rejected under 35 U.S.C. § 102(e) as anticipated by Okamoto (U.S. Patent No. 6,329,087) and Claims 1-3 and 5-13 were rejected under 35 U.S.C. § 102(e) as anticipated by Inoue (US 2002/0145834). The Examiner found that each of these references discloses a magnetic read head comprising a head gap fill layer. Although none of the references teaches a head gap fill layer formed by ALD, the Examiner found that the limitation "ALD formed" is not germane to the determination of patentability because process limitations are not further limiting in terms of the structure resulting from the claim process. However, the Examiner notes that this feature would be relevant to the patentability of the claims if an unobvious difference can be shown to result from the claimed process limitations. In this regard, the Examiner took official notice that sputtering

and ALD are both known methods for forming dielectric layers used as magnetic gaps in the field of magnetic read heads.

Without acquiescing in the Examiner's position, Applicants submit that the fact that both ALD and sputtering may be used for forming dielectric layers does not indicate that there are no unobvious structural differences between ALD deposited layers and layers formed by sputtering. To the contrary, Applicants submit that there are significant unobvious differences between ALD formed layers and layers formed by sputtering.

One of skill in the art would recognize that ALD deposited layers inherently have significant structural differences from layers deposited by sputtering, as can be seen from the reported differences in their physical properties. For example, when traditional PVD alumina thin films for reader gap applications were compared with ALD alumina thin films, it was found that the ALD films had higher breakdown voltage and were pinhole free, while the PVD films had increased pinhole density (*see ALD Technology is in the Process of Taking ASAP*, micromagazine.com June 2002, courtesy copy attached). Similarly, U.S. Patent No. 6,700,752 explicitly compares conventional sputter deposited reader gap films with ALD deposited films (see column line 56 through column 8, line 39 and Figs. 10-11), finding that in comparison to sputtered films "the ALD process provides very dense, conformal, low leakage current, high breakdown voltage films..." and that "the ALD process has low pinhole density, low impurity concentration and good step coverage and can be used without a presputter etch" (column 8, lines 17-22). In a reflection of the physical differences between the ALD deposited and sputter deposited films, the '752 patent teaches that the failure rate using conventional reactive sputtering deposition is significantly higher than the failure rate of films deposited using the ALD process (column 8, lines 1-39; Figures 10 and 11). Thus, even in the context of head gap fill layers, it is clear that ALD films and sputtered films have different physical properties that can be attributed to significant structural differences.

As none of the references cited by the Examiner teaches or suggests an ALD deposited head gap fill layer as claimed, Applicants submit that the rejections submitted under 35 U.S.C. § 102 should be withdrawn.

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Claims Rejections Under 35 U.S.C. § 103

Claims 4 and 14-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Inoue in view of Applicants' admissions. In particular, the Examiner found that "Applicants admit that a thickness variation of less than 2% is a desirable characteristic for a read gap fill layer." In this regard, Applicants submit that the disclosure of the advantage of a thickness variation of less than 2% in the specification is not an admission that the benefits of such a thickness variation would have been known to one of skill in the art at the time the application was filed.

As discussed above, Inoue fails to teach or suggest an ALD formed head gap fill layer as recited in Claims 1 and 14 as amended. Claims 4 and 15-17 depend from Claims 1 and 14, respectively and contain all the limitations thereof in addition to further distinguishing features. Thus, Applicants submit that the rejection under 35 U.S.C. § 103 should be withdrawn as well.

Conclusion

In view of the amendments and arguments presented above, Applicants submit that the present application is in condition for allowance and respectfully request the same. If any issues remain, the Examiner is cordially invited to contact Applicant's representative at the number provided below in order to resolve such issues promptly.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

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By: Adeel S. Akhtar
Adeel S. Akhtar
Registration No. 41,394
Attorney of Record
Customer No. 20,995
(415) 954-4114